Testimony of the

**Geological Society of America**

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Regarding the

**National Science Foundation**

FY 2010 Budget Request

To the

**U.S. House of Representatives**

Committee on Appropriations
Subcommittee on Commerce, Science, Justice and Related Agencies
March 27, 2009

**Summary**

The Geological Society of America urges Congress to appropriate at least $7.0 billion for the National Science Foundation (NSF) in fiscal year 2010, an increase of approximately $500 million or 8 percent compared to the enacted level in the Omnibus Appropriations Act for FY 2009. This funding level would uphold the President's FY 2010 budget request of $7.0 billion for the National Science Foundation. However, it is below the authorized funding level of $8.1 billion under the America COMPETES Act (Public Law 110-69).

The Geological Society of America supports strong and growing investments in earth science research at the National Science Foundation and other federal agencies. Substantial increases in federal funding for earth science research are needed to ensure the health, vitality, and security of society and for stewardship of Earth. These investments in earth science research are necessary to address such issues as energy resources, water resources, climate change, and natural hazards. Earth science research forms the basis for training and educating the next generation of earth science professionals.

*The Geological Society of America, founded in 1888, is a scientific society with over 22,000 members from academia, government, and industry in all 50 states and more than 90 countries. Through its meetings, publications, and programs, GSA enhances the professional growth of its members and promotes the geosciences in the service of humankind. GSA encourages cooperative research among earth, life, planetary, and social scientists, fosters public dialogue on geoscience issues, and supports all levels of earth science education.*

## Rationale

Science and technology are engines of economic prosperity, environmental quality, and national security. Federal investment in research pays substantial dividends. According to a recent report by the National Academies, "...the economic value of investing in science and technology has been thoroughly investigated. Published estimates of return on investment (ROI) for publicly funded R&D range from 20 to 67%" (*Rising Above the Gathering Storm*, 2007).

The earth sciences are critical components of the overall science and technology enterprise. Substantial increases in federal funding for earth science research are needed to ensure the health, vitality, and security of society and for Earth stewardship. Earth science research provides knowledge and data essential for developing policies, legislation, and regulations regarding land, mineral, and water resources at all levels of government. Growing investments in earth science research are required to stimulate innovations that fuel the economy, provide security, and enhance the quality of life.

## Broader Impacts of Earth Science Research and Education

It is critically important to significantly increase NSF's investments in earth science research and education to meet challenges posed by human interactions with Earth's natural system in order to help sustain these natural systems and the economy. Additional NSF investments in earth science research are necessary to address such issues as natural hazards, energy, water resources, and climate change.

- Natural hazards, such as earthquakes, tsunamis, volcanic eruptions, floods, droughts, and hurricanes, remain a major cause of fatalities and economic losses worldwide. An improved scientific understanding of geologic hazards will reduce future losses through better forecasts of their occurrence and magnitude.
- Energy and mineral resources are critical to the functioning of society and to national security and have positive impacts on local, national, and international economies and quality of life. These resources are often costly and difficult to find, and new generations of geoscientists need the tools and expertise to discover them. In addition, management of their extraction, use, and residue disposal requires a scientific approach that will maximize the derived benefits and minimize the negative effects. Improved scientific understanding of these resources will allow for their better management and utilization while at the same time considering economic and environmental issues. This is particularly significant because shifting resource demands often reframe our knowledge as new research–enabling technologies become available.
- The availability and quality of surface water and groundwater are vital to the well being of both society and ecosystems. Greater scientific understanding of these critical resources—and communication of new insights by geoscientists in formats useful to decision makers—is necessary to ensure adequate water resources for the future.

- Forecasting the outcomes of human interactions with Earth's natural systems, including climate change, is limited by an incomplete understanding of geologic and environmental processes. Improved understanding of these processes in Earth's history can increase confidence in the ability to predict future states and enhance the prospects for mitigating or reversing adverse impacts to the planet and its inhabitants.
- Research in earth science is also fundamental to training and educating the next generation of earth science professionals.

Increased NSF investments in earth science education at all levels is needed because knowledge of the earth sciences is essential to science literacy and to meeting the environmental and resource challenges of the twenty-first century.

Earth science research and education should be a component of broader initiatives to increase overall public investments in science and technology. For example, earth science research should be included in a recommendation by the National Academies to "increase the federal investment in long-term basic research by 10% each year over the next 7 years..." (*Rising Above the Gathering Storm*, 2007). Likewise, implementation of the America COMPETES Act, which authorizes a doubling of the budgets of key science agencies in seven years, should encompass earth science research and education.

**Extraordinary Scientific Opportunities in the Earth Sciences**

Extraordinary scientific opportunities in the solid earth sciences have been summarized by the National Academies and other organizations, including the following reports:

- *Basic Research Opportunities in the Earth Sciences* (National Research Council, 2001)
- *The Geological Record of Biosphere Dynamics* (National Research Council, 2005)
- *Hydrology of a Dynamic Earth* (Consortium of Universities for the Advancement of Hydrologic Science, 2007)
- *Future Research Directions in Paleontology* (Paleontological Society and Society for Vertebrate Paleontology, 2007)
- *Seismological Grand Challenges in Understanding Earth's Dynamic Systems* (Incorporated Research Opportunities for Seismology, 2009)

While the NSF's Earth Sciences Division regularly receives a large number of exciting research proposals that are highly rated for both their scientific merit and their broader impacts, only a small percentage of these have been funded in recent years due to budget constraints. Modest additional investments in this research can have significant positive impacts. For example, Interferometric Synthetic Aperture Radar (InSAR) studies may improve our ability to forecast earthquakes and volcanic eruptions. Underinvestment in the earth sciences may result in lost opportunities and lost lives.

EarthScope is producing transformative science while being developed on time and on budget. The transition of EarthScope expenses from NSF's Major Research Equipment and Facilities Construction (MREFC) account to the Research and Related Activities (R&RA) account is

occurring at a time when the NSF budget has been nearly stagnant in real dollars. When the project was being developed, it was widely expected that the NSF budget would experience robust growth as indicated by the NSF Authorization Act of 2002, the American Competitiveness Initiative, and the America COMPETES Act.

As a result of budgetary developments beyond its control, members of the earth science community are concerned that new expenses for EarthScope operations and maintenance may have significant negative impacts on other time-sensitive opportunities in the earth sciences. The success rate for new proposals in the Earth Sciences Division is already too low and new expenses for EarthScope operations and maintenance expenses may drive the success rate even lower.

**Conclusion**

President Obama has not submitted a detailed FY 2010 budget request for the National Science Foundation and therefore we are unable to comment of the specifics of his budget proposal at this time. The FY 2010 budget request comes at a critical juncture in the history of the National Science Foundation. The America COMPETES Act set the stage to double the NSF budget in seven years. Despite overwhelming bipartisan support for the America COMPETES Act, funding for NSF fell short of the doubling path in the regular appropriations cycles for fiscal years 2007, 2008, and 2009. NSF received $3 billion in economic stimulus funds under the American Recovery and Reinvestment Act. This one-time injection of funding is very helpful, but NSF needs sustained annual funding increases in order to achieve the objectives of the legislation.

The Geological Society of America is grateful to the House Appropriations Subcommittee on Commerce, Science, Justice and Related Activities for its past leadership in increasing the budget for the National Science Foundation and other science agencies. We are also grateful to the subcommittee for its leadership in providing $3.0 billion in stimulus funds for NSF under the American Recovery and Reinvestment Act of 2009. Thank you for your thoughtful consideration of our request. For additional information or to learn more about the Geological Society of America, please visit www.geosociety.org or contact Dr. Craig Schiffries at cschiffries@geosociety.org.